

Remarks

Examiner Lavilla is thanked for the thorough Office Action.

In the Specification

The specification has been reviewed and amendments made to correct typographical and editorial errors. No new matter has been added.

The specification is amended on p. 13 to include the exact subject matter of claims 8 and 25. No new matter is added. For support see claim 8 and comments below.

In the Claims

The Claims are amended as discussed below. Note that all amendments to the claims are for clarification purposes and not in response to prior art rejections. No new matter is added.

CLAIM REJECTIONS:

Rejection of claims 1-30 under 35 U.S.C. §112

The rejection of claims 1-30 under 35 U.S.C. §112 is acknowledged. Reconsideration and withdrawal of the rejection is respectfully requested in view of the amendments.

With respect to claim 1, (See OA dated 4/19/2002, paragraph 5 a.), Claim 1 is amended to remove reference no. "18".

With respect to claims 4, 17 and 21 (See OA dated 4/19/2002, paragraph 5 b.), Claims 4, 17 and 21 are amended to clarify the "middle non-magnetic conductor layer" (18b) is referred to. For support see figs 3A, 3B and spec. 19, lines 10-24. No new matter is added.

With respect to claims 8 and 25 (See OA dated 4/19/2002, paragraph 5 c.),

Claims 8 and 25 are amended to clarify that the materials are alternative choices as obvious to those skilled in the art. For support see spec. 17, lines 1-13. Also, the specification is amended on p. 13 to include the exact subject matter of claims 8 and 25. No new matter is added.

With respect to claims 14 (See OA dated 4/19/2002, paragraph 5 e.), the phase is amended as follows to give proper antecedent basis: "[spin filtering] giant magnetoresistive (GMR) sensor element". For support see spec. p. 22, L 1-8.

With respect to claims 16 (See OA dated 4/19/2002, paragraph 5 e.), Claim 16 is amended to change "further includes" to --wherein--.

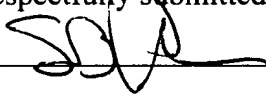
Note that all amendments to the claims are for clarification purposes and not in response to prior art rejections.

CONCLUSION

In conclusion, reconsideration and withdrawal of the rejections are respectfully requested. Allowance of all claims is requested. Issuance of the application is requested.

It is requested that the Examiner telephone the undersigned attorney George Saile at (845) 452-5863 should there be anyway that we could help to place this Application in condition for Allowance.

Respectfully submitted,



Steve Ackerman

reg no. (37,761)

Version with markings to show changes

In the specification

After the 1 full Paragraph on spec p.13 and before the Heading letter "G"
Please insert the following: ----The free ferromagnetic layer is preferably comprised of: CoFe, CoFe/NiFe, or Co/NiFe and has a thickness of 20 to 30 Å.---

In the Claims

1. (Amended) A method for forming a giant magnetoresistive (GMR) sensor element comprising:

forming a seed layer over a substrate, the seed layer being formed of a magnetoresistive resistivity sensitivity enhancing material selected from the group consisting of nickel chromium alloys, nickel -chromium-copper alloys and nickel-iron-chromium alloys;

forming a metal oxide buffer layer over the seed layer; said metal oxide buffer layer comprised of NiO or alpha Fe₂O₃;

forming a free ferromagnetic layer over said metal oxide buffer layer;

forming a non-magnetic conductor spacer layer over said free ferromagnetic layer;

forming a pinned ferromagnetic layer over the non-magnetic conductor spacer layer ; and

forming a pinning material layer over the pinned ferromagnetic layer [18];
and

forming a capping layer over said pinning material layer.

8. (Amended) The method of claim 1 wherein said free ferromagnetic layer is comprised of: CoFe, CoFe/NiFe,or Co/NiFe and has a thickness of 20 to 30 Å.

14. (Amended) The method of claim 1 wherein the [spin filtering] giant magnetoresistive (GMR) sensor element is selected from the group consisting of simple spin valve magnetoresistive (SVMR) sensor elements, synthetic antiferromagnetically biased giant magnetoresistive

(GMR) sensor elements, simple spin filter giant magnetoresistive (GMR) sensor elements and spin filter synthetic antiferromagnetically biased giant magnetoresistive (GMR) sensor elements.

16. (Amended) The method of claim 15 [which further includes] wherein: said high conductivity layer is comprised of Cu or Cu-Ni and has a thickness between 10 and 30Å.
17. (Amended) The method of claim 15 wherein said pinned ferromagnetic layer is composed of a three layer structure comprising: (a) a lower AP layer, a middle non-magnetic conductor spacer layer and an upper AP layer wherein said middle non-magnetic conductor spacer layer induces anti-ferromagnetic coupling between said lower AP layer and said upper AP layer which enhances the Pinning effect.
21. (Amended) The method of claim 18 wherein said pinned ferromagnetic layer is composed of a three layer structure comprising: (a) a lower AP layer, a middle non-magnetic conductor spacer layer and an upper AP layer wherein said middle non-magnetic conductor spacer layer induces anti-ferromagnetic coupling between said lower AP layer and said upper AP layer which enhances the Pinning effect.
25. (Amended) The spin valve giant magnetoresistance sensor of claim 18 wherein said free ferromagnetic layer is comprised of: CoFe, CoFe/NiFe, or Co/NiFe and has a thickness of 20 to 30 Å.